

**REMARKS**

**I. Introduction**

Claims 1-5, 8, 9, 12-15 and 17 are currently pending in this application. Claims 1 and 17 have been amended to incorporate the elements of cancelled claim 11. Claims 6, 7, 10 and 16 were previously cancelled.

For at least the following reasons this application should be allowed and the case passed to issue.

**II. Claim Rejections under 35 U.S.C. § 103(a)**

Claims 1-5, 8, 9 and 11-15 and 17 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kilb et al U.S. Patent Application Publication No. 2001/0016282 (Kilb) in view of Yanagihara et al., U.S. 5,543,250 (Yanagihara). Applicants respectfully disagree. However, in an effort to expedite prosecution, claims 1 and 17 have been amended to incorporate the elements of cancelled claim 11.

Claims 1 and 17 now each recite in pertinent part, “wherein said tip ends buried in said first electrode or said second electrode have a length that is 10% or more of the apparent thickness of said current collector plate (g) including said protrusions.”

It is well established that under 35 U.S.C. § 103(a), “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F. 3d 977, 988 (Fed. Cir. 2006). At a minimum, the cited prior art does not disclose (expressly or inherently) a conductive sheet having protrusions with tip ends that are

buried in a first electrode or a second electrode and that these tip ends have a length that is 10% or more of the apparent thickness of the current collector plate (g) including the protrusions, as recited in independent claims 1 and 17. Moreover as discussed below, this configuration produces unexpectedly superior results.

Kilb discloses a battery having a configuration with an electrode having an exposed metallic region which is free of active material, the metallic region being adjacent to the cell case, and a spring. Kilb further discloses that the electrode further has a central cut-out or cavity (9), see FIG. 1. Kilb teaches a region free of active material, i.e., a substrate exposed portion is provided on the surface of the framework facing the cell cap (see paragraph [0014]). Kilb also teaches in paragraph [0022] that, the recesses (11) provided on a flat spring (7) arranged above the electrode, together with the cavity (10) arranged in the center of the electrode, ensures good gas exchange.

Kilb is silent as to the burying only the tip ends of any protrusions of current collector in the electrode material or how deep the tips are buried, as recited in amended claims 1 and 17. In fact the Examiner concedes on page 4 of the Office Action dated October 24, 1008 that Kilb fails to disclose *any protrusions* on the support.

Therefore, the Examiner relies on Yanagihara for this alleged disclosure.

However, Applicants respectfully submit that (1) Yanagihara does not teach or suggest a configuration in which protrusions have tip ends that are buried in the first electrode or the second electrode, and wherein the tip ends buried in the first electrode or the second electrode have a length that is 10% or more of the apparent thickness of the current collector plate (g) including the protrusions; and (2) a person having ordinary skill in the art would not have modified Kilb with Yanagihara because the disclosure of Yanagihara *teaches away* from the

disclosure of Kilb, and because the configuration as recited in amended claims 1 and 17 produces unexpectedly better results.

Yanagihara does not teach or suggest tip ends buried in the first electrode or the second electrode having a length that is 10% or more of the apparent thickness of the current collector plate (g) including the protrusions. Yanagihara consistently describes that burrs (3) are **completely** buried in the interior of the electrode and are not exposed (see FIGS. 5 and 6 of Yanagihara). Furthermore, the results shown in Tables 1 and 2 in Example 1 of Yanagihara indicated that using a substrate punched from both sides as shown in FIG. 3 is preferable. However, assuming the substrate having the burrs (3) on both sides as shown in FIG. 3 is used and an electrode from which the burrs are exposed is produced, the exposed burrs would penetrate the separator (13), causing an internal short circuit in the battery as the separator is considerable thinner than the electrode.

Moreover, in the case of using a substrate as shown in FIG. 2, Yanagihara employs the electrode structure as shown in FIG. 6, in which care is taken so that the burrs (3) are not exposed from the surface of the electrode.

As such, it is clear that Yanagihara emphasizes throughout the disclosure that the burrs (3) be completely buried in the interior of the electrode.

Therefore, it is clear from the above discussion that, Yanagihara *teaches away* from the present claims which recite a gas transfer pathway or gap, as the burrs of Yanagihara would destroy the gas transfer pathway.

Furthermore, a person having ordinary skill in the art would not have combined Kilb with Yanagihara. As discussed above, Kilb teaches a region free of active material, i.e., a substrate exposed portion is provided on the surface of the framework facing the cell cap (see, paragraph [0014]). This exposed portion functions as a space for facilitating gas exchange. Yanagihara, on the other hand, teaches away from any gap because, as discussed above, Yanagihara emphasizes the importance of the burrs being **completely buried** in the electrode.

A prior art reference must be considered in its entirety, i.e., as a **whole**, including portions that would lead away from the claimed invention. Such a teaching away from a claimed invention constitutes potent evidence of non-obviousness. See, for example, *In re Bell*, 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993); *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986); *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

Furthermore, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

As such, Applicants respectfully submit that the combination of Kilb and Yanagihara does not teach or suggest all of the elements of amended claims 1 and 17, and further, the combination of these prior art references is not viable. This is because modifying Kilb with Yanagihara would destroy the gas exchange function disclosed in Kilb.

Moreover, as shown in Table 7 of the instant specification, the configuration as recited in claims 1 and 17, in which the ratio of the length of protrusion tip ends buried in the electrode to the apparent thickness of the current collector plate including the protrusion is 10%, achieves unexpectedly better results, such as a 50% decrease in the internal resistance  $I_{5th}(\Omega)$ .

Accordingly, for all of the foregoing reasons, claims 1 and 17 are allowable over the prior art.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987).

Therefore, as independent claim 1 is patentable for the reasons set forth above, it is respectfully submitted that claims 2-5, 8, 9, 11-15, which are dependent on claim 1, are also patentable.

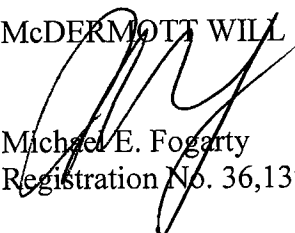
### **III. Conclusion**

In view of the above amendments and remarks, Applicants respectfully submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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